

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
7 October 2004 (07.10.2004)

PCT

(10) International Publication Number
WO 2004/085998 A2

- (51) International Patent Classification⁷: **G01N** (72) Inventors; and
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(21) International Application Number: PCT/US2004/009192 tram, P. [IN/US]; 1134 N. Bethlehem Pike, Lower
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(22) International Filing Date: 26 March 2004 (26.03.2004) 801 Yale Avenue #403, Swarthmore, PA 19081 (US).
(25) Filing Language: English ZNIDARSIC, William [US/US]; 4045 Baltimore Avenue,
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(26) Publication Language: English (74) Agent: VOLIN, Marina, E.; Caesar, Rivise, Bernstein,
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(30) Priority Data: 60/458,258 28 March 2003 (28.03.2003) US
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(US).
(81) Designated States (unless otherwise indicated, for every
kind of national protection available): AE, AG, AL, AM,
AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN,
CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI,
GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE,
KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD,
MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG,
PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM,

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(54) Title: BIOMIMETIC HIERARCHIES USING FUNCTIONALIZED NANOPARTICLES AS BUILDING BLOCKS

Flow Chart for Biomimetic Assembly on Nanoparticles



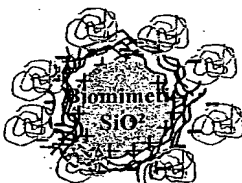
Silica colloid (or
polymer colloid)



+ Covalently bonded
surface charge



Negatively charged
polymeric species
(e.g., PAA)



Positively charged
biopolymer (e.g.,
collagen)

(57) Abstract: The invention provides a three-dimensional construct including a polymeric matrix and a nanoparticle as shown in Fig. 1 having a diameter of about 5 nm to about 10 microns, wherein the nanoparticle is (a) coated with at least two monomolecular layers each carrying biological information and (b) dispersed in the polymeric matrix at a density of at least 0.01 vol%. The invention further provides a method of presenting biological information to a cell or a tissue and thereby affecting at least one parameter of the cell or the tissue, the method involves providing the three-dimensional construct and contacting it with the cell or the tissue to present the biological information and thereby affecting at least one characteristic of the cell or the tissue. In certain embodiments, the diameter, the biological information and the density are selected to affect at least one characteristic of the cell or the tissue.

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TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

(84) **Designated States** (*unless otherwise indicated, for every kind of regional protection available*): ARIPO (BW, GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK,

Published:

— *without international search report and to be republished upon receipt of that report*

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